

Exhibit 3

CURRICULUM VITAE ROBERT LARRY GRAYSON

PERSONAL DATA

Address: The Pennsylvania State University
Department of Energy & Mineral Engineering
103A Hosler Building
State College, PA 16802-5000

Phone: 814-863-1644 (office) FAX: 814-865-3248
814-278-1937 (home)

E-mail:RLG19@psu.edu

EDUCATIONAL BACKGROUND

West Virginia University, Morgantown, WV

Ph.D. in Engineering, 1986
Major: Engineering of Mines; Minor: Operations Research/Statistics
Exxon Fellowship

M.S. in Engineering of Mines, 1981
(Worked full time in coal industry concurrently)

B.S. in Engineering of Mines, 1978
(Magna Cum Laude, Old Timers' Award; worked full time in coal industry concurrently)

California University, California, PA

B.A. in Mathematics, 1974
(Summa Cum Laude, F.E. Atkins Mathematics Award; tutored 30 hours per week)

PROFESSIONAL CERTIFICATIONS

- * Registered professional mining engineer in Pennsylvania (No. PE-031071-E; March, 1982), West Virginia (No. 9541; June, 1984) and Missouri (No. E-28427; December, 1996).

- * Certified in Pennsylvania as Mine Foreman (No. 966; November, 1979) and as

Mine Examiner (No. 1766; March, 1979).

* Previously certified as MSHA Part 48 Instructor and Impoundment Inspector.

OTHER PROFESSIONAL TRAINING

Rock Mechanics Short Course, NIOSH Spokane Research Laboratory, 2000, a one-day formal course.

Basic Project Officer, U.S. Department of Health and Human Services, 1999, a four-day formal course.

Management Development, U.S. Department of Agriculture, Graduate School, 1999, a five-day formal course.

Bleeder and Gob Ventilation Systems, 1995, a three-day short course held at the National Mine Health and Safety Academy (as a critical reviewer and evaluator).

Total Quality Management, 1992, a one-week short course for West Virginia University TQM Steering Committee members presented by the Director and staff of the Center for Entrepreneurial Studies and Development.

Managing for Productivity, 1982, a one-week leadership short course for J&L Steel Corporation managers presented by George Labovitz, a Harvard management professor.

Roof Control Specialist, 1978, a four-day short course held at the National Mine Health and Safety Academy.

EMPLOYMENT HISTORY

The Pennsylvania State University, University Park, PA: July 2, 2007 - Present

Presently Professor of Energy and Mineral Engineering; George H., Jr. and Anne B. Deike Chair in Mining Engineering; Program Officer for the Mining Engineering Program; EME Graduate Program Officer; Program Coordinator for the Mining Technology Program at Fayette Campus; and Director, Western Mining Safety & Health Training & Translation Center (until August 31, 2008).

Teaching/taught Mine Systems Analysis, Materials Handling, Mine Ventilation and Air Conditioning, Mine Maintenance Engineering, Mineral Property Evaluation, and Introductory Mining Engineering; Senior Design Project, and Management in the Mineral Industries for Environmental, Legal, and Health and Safety Problems; worked on In-Seam Seismic-based Monitoring project to detect voids in abandoned

mines; continue to serve as Director, Western Mining Safety and Health Training and Translation Center.

During August 2007 to help with countering negative opinions of the coal industry, I was interviewed, quoted and/or made appearances on mine health and safety issues and issues related to retreat mining, including TV spots with CNN news, Fox news, and MSNBC news; NPR-affiliated radio station KUER in Salt Lake City; newspapers, journals and news services including New York Times, Wall Street Journal, Pittsburgh Post-Gazette, Charleston Gazette, Associated Press, and over 500 other newspapers.

Following mine disaster in April 2010, worked with the National Mining Association, the West Virginia Coal Association, various coal companies, and Congressional staff persons on mine safety and health reform legislation, specifically regarding a potential replacement approach to the Pattern of Violations process; gave testimony on July 13th at the *House Education and Labor Committee* hearing on this issue. Also gave multiple presentations at industry-related events and testimony at MSHA hearings on related topics.

University of Missouri-Rolla, Rolla, MO: November 6, 2000 – June 30, 2007

7/1/06 to 6/30/07 Union Pacific/Rocky Mountain Energy Professor of Mining Engineering; Director, Western Mining Safety & Health Training & Translation Center; Coordinator, online Master of Engineering in Mining Engineering; and Interim Director, Energy Research and Development Center

Taught courses in Principles of Mining Engineering, Introduction to Mining Safety, Mine Rescue, Mine Management, Mineral Processing, Mine Power and Drainage, Coal Mine Development and Production, Advanced Mine Health and Safety Design, Optimization Applications in Mining, and Expert Systems Applications in Mining at various times.

Gave testimony on May 16, 2007 at the U.S. House Committee on Education and Labor relative to the Effectiveness of the Mine Safety and Health Administration's Mine Safety and Health Programs.

Served as Chair of the Mine Safety Technology and Training Commission, which was an independent and multi-partite commission established by the National Mining Association to address underground coal mines fatalities from fires and explosions that occurred in 2006.

During the period January through July 2006 to help with countering negative opinions of the coal industry, I was interviewed, quoted for and/or made appearances on over 40 media contacts on mine health and safety issues, including TV spots with CNN, CNBC, KY3, KOLR and

Rolla TV; radio stations in Los Angeles, Dover, Rolla and a spot on NPR; newspapers, journals and news services including New York Times, Wall Street Journal (twice), St. Louis Post-Dispatch, Pittsburgh Post-Gazette, Charleston Gazette, The Cincinnati Post, National Geographic News, Springfield News-Leader, Scripps-Howard, Knight Ridder, Associate Press, and others. Also appeared before the U.S. Senate *Committee on Health, Education, Labor, and Pensions*: Subcommittee on Employment and Workplace Safety to discuss communication and mine safety technology issues. In August 2006, was interviewed by the General Accounting Office, the research arm of Congress, on mine health and safety issues.

Managing as Director and PI a \$4.02 million grant from CDC-NIOSH for the Western U.S. Mining Safety and Health Training & Translation Center, from September 1, 2004 for a period of 5 years. It is a consortium with Colorado School of Mines, Montana Tech, and University of Utah.

PI for a DoEd Graduate Assistance in Areas of National Need Fellowship program on Energy Technology Linked with Sound Public Policy Making, from August 15, 2004, for a period of 3 years.

11/7/00-
6/30/06

Professor and Chair (2000-2006), Department of Mining & Nuclear Engineering, School of Materials, Energy and Earth Resources (formerly Mines and Metallurgy); Union Pacific/Rocky Mountain Energy Professor; Director, Western U.S. Mining Safety and Health Training & Translation Center; and Interim Director (and co-founder, through collaboration), Energy Research and Development Center

During this period, was responsible for overall management of the department, embracing graduate and undergraduate education and research, faculty and staff governance, the Experimental Mine, student recruitment and placement, the budget, fund raising, and alumni relations. For Mining Engineering, grew enrollments from 66 undergraduate students in FS02 to 112 undergraduate students in WS06 and from 6 graduate students in FS02 to 14 in WS06. Co-developed the online ME program in WS02 and grew it to a WS06 enrollment of 24. Managed a successful merger of Mining Engineering with Nuclear Engineering over a two-year transition period from July 1, 2004 through June 30, 2006. Nuclear Engineering had similar growth in enrollment. Facilitated an increase in research expenditures from \$657,000 in 2004 to \$2.1 million in 2006. Averaging three courses per semester, taught courses in Principles of Mining Engineering, Introduction to Mining Safety, Mine Rescue, Mine Management, Mineral Processing, Mine Power and Drainage, Coal Mine Development and Production, Advanced Mine Health and Safety Design, Optimization Applications in Mining, and Expert Systems Applications in Mining at various times.

Served as Chair of the Mine Safety Technology and Training Commission, which was an independent and multi-partite commission established by the National Mining Association to address underground coal mines fatalities from fires and explosions that occurred in 2006.

Worked collaboratively with 56 faculty members across campus to create an Energy Interest Group, and then the Energy Research Development Center, which was founded to enhance approximately \$3.8 million of research funding, and to focus on the integration of technology development with key issues that need to be considered in holistic public policy making.

Chaired the National Research Council Committee on Material Flows Accounting of Natural Resources, Products, and Residuals between July 2002 and July 2003. The study was sponsored by the Department of Energy, the Environmental Protection Agency, the United States Geological Survey, and the National Science Foundation, and was charged with studying the value of establishing material flows accounts, analogous to financial accounts, to track the flows of materials and energy through the economy to better determine holistic impacts on the economy, the environment, ecological balances, and public health in making sound public policy.

Served as Chair of the national Mine Safety and Health Research Advisory Committee, Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, until December 23, 2006.

Served on the Executive Committee of the Board on Natural Resources and Chair of the Section on Mineral and Energy Resources, National Association of State Universities and Land Grant Colleges.

Awarded a \$4.02 million grant from CDC-NIOSH to establish the Western U.S. Mining Safety and Health Training & Translation Center, effective September 1, 2004 for a period of 5 years. It is a consortium with Colorado School of Mines, Montana Tech, and University of Utah.

Awarded a Department of Education grant for a Graduate Assistance in Areas of National Need Fellowship program on Energy Technology Linked with Sound Public Policy Making, effective August 15, 2004, for a period of 3 years.

National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, Washington, D.C.: November 3, 1997 – November 3, 2000

11/97 to
11/00

Associate Director, Office for Mine Safety and Health Research

Served in a Senior Biomedical Research Service position (SES equivalent) to plan, organize, manage and facilitate the national mine health and safety research program. Oversaw directly national mine health and safety research laboratories in Pittsburgh, PA, and Spokane, WA. Managed the merger of the former U.S. Bureau of Mines laboratories into NIOSH.

Coordinated the planning and execution of the mining research program and other activities across all NIOSH divisions. Responsible for advising the NIOSH director with scientific judgment on mine health and safety issues. Coordinated NIOSH mining-related policy and publications across the Institute.

Served as the primary NIOSH contact with the Mine Safety and Health Administration, National Mining Association, Bituminous Coal Operators Association, the United Mine Workers of America, and other mining associations and labor organizations. Facilitated and developed first-time, highly visible research partnerships among mine operators, associations, and organized labor on sensitive issues (diesel exhaust, dust, noise, and ergonomics). Served as the Executive Secretary of the Mine Safety and Health Research Advisory Committee to NIOSH, responsible for coordinating meeting agendas, minutes, and make-up of the committee.

Planned and coordinated the content of and the budget for extramural research solicitations (grants and cooperative agreements), and monitored progress on successful applications.

Effectuated a new strategic planning process for prioritizing the national mine health and safety research agenda, coupling broad constituency inputs with risk analyses. Focused on reaching a balance of research to embrace the needs of miners across all commodities and mine types.

University of Missouri-Rolla, Rolla, MO: August 1, 1996 – October 31, 1997

7/97 to
10/97

Professor and Acting Chair, Department of Mining Engineering, School of Mines & Metallurgy

As Acting Chair, oversaw administrative duties of the department while the Chair was on sabbatical. Also, taught courses in Introduction to Mining Safety, Mine Management, Coal Mine Development and Production, and Expert Systems Applications in Mining. Graduate student and Graduate Seminar coordinator. Advisor to student mine rescue team.

Co-Director of the Graduate Assistance in Areas of National Need (GAANN) Program, funded through the U.S. Department of Education, dedicated to Environmentally Sustainable Mineral and Energy Industries.

Performed research for the State of West Virginia, Office of Miners' Health, Safety and Training, Technical Review Committee, to target priorities for mine safety interventions through analysis of the personal injury and occupational illness records of miners.

8/96 to
7/97

Professor, Department of Mining Engineering, School of Mines & Metallurgy

Taught courses in Coal Mine Development and Production, Rock Mechanics I, Introduction to Mining Safety, Mine Management, and Optimization Applications in the Mineral Industry (graduate). Graduate student and Graduate Seminar coordinator.

Project Co-Director: Graduate Assistance in Areas of National Need (GAANN) Program through U.S. Department of Education dedicated to Environmentally-Sustainable Mineral and Energy Industries; September 1, 1997-August 31, 2000.

Co-Principal Investigator (on a consulting basis) in the Small Mines Assistance Center, State of West Virginia, which has been funded over the past three years with \$108,000 and has an additional \$200,000 earmarked to it.

West Virginia University, Morgantown, WV: April 1984 – June 1996

7/95 to
6/96

Professor, Department of Mining Engineering, College of Engineering & Mineral Resources; and Chair, West Virginia State Mine Inspectors' Examining Board.

Taught two to three mining engineering courses per academic semester; undergraduate courses included Mine Management, Mine Health and Safety, Underground Mining Systems; graduate courses included Deterministic Methods for Mineral Engineers, Expert Systems in Mining, Mine Production and Cost Management, and Optimization Applications in Mining. Performed research on the following funded research projects:

- (1) A Fuzzy Logic-Based Expert Consultation System for Coalbed Methane Control and Degasification Based on the WVU MMSS System and Integrating the USBM METHPRO System (NRCCE and COMER; \$46,000 for 2 years; as Co-PI);

(2) Phase I Implementation of the Small-Mine Assistance Center
(WV OMHST, Technical Review Committee; \$33,000; as Co-PI);

(3) On-Site Power Generation at the Emerald Mine Using Coal Mine
Methane (DOE-METC; \$464,927 for 1.5 years; as Co-PI).

As Chairman of the West Virginia Mine Inspectors' Examining Board, responsible for overseeing applications and written examinations of candidates for state mine inspector, conducting oral examinations for candidates who passed the written exam, for responding to complaints about the process, and for conducting hearings for potential dismissal of inspectors from their positions (when necessary).

7/91 to
6/95

Dean, College of Mineral and Energy Resources; Director, Mining & Industrial Extension Service; Chair, State Mine Inspectors' Examining Board; and Professor, Department of Mining Engineering.

As dean and director, was responsible for managing the academic, administrative, and financial functions of the College (as dean) and Mining & Industrial Extension Service (as director), including faculty and staff governance and development, budgeting and fiscal management, promoting research and service activities, strategic planning, development of alumni and friends, and public relations. In 1995, responsive to an emerging trend of hostile mergers of mining departments across the U.S., proposed and coordinated a merger between the College of Engineering and the College of Mineral and Energy Resources in order to guarantee (through the Board of Trustees) the stand-alone integrity of the Department of Mining Engineering and to capture the heritage of the college in the new merged unit.

As professor, taught one or two mining engineering courses per academic semester; performed research on the following funded research projects:

(1) Remote Mining for In-Situ Waste Containment (U.S. D.O.E.;
\$500,000; as Co-PI);

(2) Investigations of the Relationships Between Respirable Dust Concentrations and Coal Seam Characteristics (USBM; \$150,000;
as Co-PI);

(3) Mineralogical Identification, Sizing, and Depth Profiling of
Respirable Coal Mine Dust Particles (USBM; \$252,000; as PI);

(4) Flexible Automation of Underground Coal Mines (USBM; \$2.3 MM;
as Co-PI);

- (5) A Fuzzy Logic-Based Expert Consultation System for Coalbed Methane Control and Degasification Based on the WVU MMSS System and Integrating the USBM METHPRO System (NRCCE and COMER; \$46,000 for 2 years; as Co-PI);
- (6) Planning the Structure and Mission of a Statewide Center for Mine Health and Safety: Addressing the Small-Mine Needs (WV OMHST Technical Review Committee; \$42,000; as Co-PI);
- (7) Investigation of Countermeasures to Solve West Virginia's Small Mines Fatality Problem (NRCCE; \$24,000; as Co-PI).

As Chairman of the West Virginia Mine Inspectors' Examining Board, responsible for overseeing applications and written examinations of candidates for state mine inspector, conducting oral examinations for candidates who passed the written exam, for responding to complaints about the process, and for conducting hearings for potential dismissal of inspectors from their positions (when necessary).

8/89 to 7/91 Associate Professor, Department of Mining Engineering.

Taught Mineral Engineering Problem Solving, Mine Management, Underground Mining Equipment, Deterministic Methods for Mineral Engineers, and Mine Health and Safety courses; tutored students in mathematics, physics, and chemistry; supervised and/or conducted research on the following sponsored projects:

- (1) Mineralogical Identification, Sizing, and Depth Profiling of Respirable Coal Mine Dust Particles (USBM; \$252,000; PI);
- (2) Flexible Automation of Underground Coal Mines (USBM; \$2.3 MM; Co-PI);
- (3) Correlation of Respirable Dust Characteristics with Coal Seams, Worker Positions, and Mining Method (USBM; \$297,000; PI);
- (4) Research to Formalize Occupational Training for Longwall Mining, Preparation Plants and Haulage Jobs (USBM; \$437,000; Research Associate);
- (5) Coal Mine Injury Analysis: A Model for Reduction Through Training (USBM; \$220,000; Research Associate);
- (6) Computer Usage and Software Applications in the Coal Industry (WVU-EWRC; \$36,000; Co-PI);

- (7) Formulation, Evaluation, and Verification of Respirable Dust Sampling and Analytical Strategies (USBM; \$107,000; Co-PI).

8/87 to 8/89 Assistant Professor, Department of Mining Engineering.

Taught Mineral Engineering Problem Solving, Mine Management, Mine Health and Safety, and Deterministic Methods in Mineral Engineering courses; established the first Mine Health and Safety Laboratory in U.S. mining schools; tutored students in mathematics and chemistry; supervised as principal or co-principal investigator and/or conducted research as a research associate on the following sponsored projects:

- (1) Correlation of Respirable Dust Characteristics with Coal Seams, Worker Positions, and Mining Methods (USBM; \$297,000; PI);
- (2) Research to Formalize Occupational Training for Longwall Mining, Preparation Plants and Haulage Jobs (USBM; \$437,000; Research Associate);
- (3) Face Decision Support System for Underground Coal Mine Section Foremen (USBM; \$707,000; Research Associate);
- (4) Coal Mine Injury Analysis: A Model for Reduction Through Training (USBM; \$220,000; Research Associate);
- (5) Computer Usage and Software Applications in the Coal Industry (WVU-EWRC; \$36,000; Co-PI);
- (6) Formulation, Evaluation, and Verification of Respirable Dust Sampling and Analytical Strategies (USBM; \$107,000; Co-PI).

7/86 to 8/87 Research Assistant Professor, Department of Mining Engineering.

Taught Mineral Engineering Problem Solving and Mine Management courses; supervised and/or conducted research on three USBM-sponsored research projects.

1/85 to 7/86 Lecturer, Department of Mining Engineering.

Taught Mine Management courses; conducted research on three USBM-sponsored projects.

4/84 to 1/85 Graduate Research Assistant, Department of Mining Engineering.

Conducted research on the USBM project entitled Correlation of

Respirable Dust Characteristics to Coal Seams, Workers' Locations, and Mining Methods.

LTV Steel Corporation (Jones & Laughlin Steel Corporation, Lykes Resources, Nemacolin Mines Corporation): 1975 – 1984

2/82 to 1/84 Superintendent, Nemacolin Mine and Preparation Plant, Nemacolin, PA.

In charge of administration, planning and control of underground and surface operations for an underground coal mine and preparation plant which produced 750,000 to 1,000,000 raw tons per year. The mine realized a 56% increase in sectional shift productivity, and the mining cost per ton was reduced by \$10.11 from 1982 to 1983. Grievances were reduced by one half during the same time period. I planned, organized and implemented the first super section in Pennsylvania at this mine.

2/81 to 2/82 Group Chief Mining Engineer, Vesta/Nemacolin Group, Raw Materials Division, McMurray, PA.

Responsible for supervision of the engineering functions of two underground coal mines and associated surface facilities. Both longwall and room-and-pillar, continuous mining operations were involved.

10/80 to 2/81 Mine Engineer, Vesta No. 5 Mine, Scenery Hill, PA.

In charge of the engineering function for an underground, bituminous coal mine; made plans and solved operational problems relating to ventilation, roof control, subsidence, governmental compliance, longwall moves, haulage and drainage.

10/79 to 10/80 Section Foreman, Nemacolin Mine, Nemacolin, PA.

Responsible for production from an underground room-and-pillar section (development and retreat), the health and safety of a 7-man crew, and for compliance with state and federal coal mining laws.

3/78 to 10/79 Foreman Trainee, Nemacolin and Vesta No. 4 Mines, McMurray, PA.

Extensively prepared for a position as an assistant mine foreman by making detailed time studies, giving annual Part 48 refresher training for miners and studying all aspects of state and federal mining laws.

10/75 to 3/78 Junior Mining Engineer, Nemacolin Mine, Nemacolin, PA.

Responsible for preparation of daily and monthly operations analyses, in-

mine monthly ventilation survey, preparation of roof control, ventilation and subsidence plans for submission to state and federal agencies, and preparation of annual and 5-year operating plans.

5/75 to 10/75 Chainman, Nemacolin Mine, Nemacolin, PA.

Performed routine survey and map work.

2/75 to 5/75 General Laborer, UMWA, Nemacolin Mine, Nemacolin, PA.

Performed underground coal mine labor in production sections and other areas.

California State College, California, PA: 1972 – 1974

8/72 to 12/74 Student and Mathematics Tutor.

U.S. Air Force: 1965 – 1972

10/65 to 7/72 Personnel Technician at Pentagon, Alaska, and Texas.

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

MEMBERSHIPS

Society for Mining, Metallurgy, and Exploration (SME), AIME
Pittsburgh Section of SME-AIME
Penn Anthracite Region of SME-AIME
Pittsburgh Coal Mining Institute of America (PCMIA)
St. Louis Section of SME-AIME, formerly
Illinois Mining Institute (IMI), formerly
International Society of Mine Safety Professionals (ISMSP), formerly
St. Louis Coal Club, formerly
Southeast Missouri Section of SME-AIME, formerly
Mine Inspectors Institute of America (MIIA), formerly
Holmes Safety Association (HAS), formerly
National Safety Council (NSC); organizational member, formerly
National Society of Professional Engineers (NSPE); formerly
West Virginia Coal Mining Institute (WVCMI); formerly
Southeast Missouri Safety Association; formerly
SME, Washington, D.C. Section; formerly
Golden Key National Honor Society
Phi Kappa Phi Honor Society

PROFESSIONAL/COMMITTEE ACTIVITIES

Editor in Chief, Minerals, a new open access journal

For SME, coordinated the hosting by the SME Penn State Student Chapter of the National Science Teachers Association Annual Meeting on November 11-13, 2010, in Baltimore

OneMine Board of Directors, SME

National Institute for Occupational Safety and Health (NIOSH), National Occupational

Research Agenda (NORA) Mining Sector Council (member 2010-present)

National Institute for Occupational Safety and Health (NIOSH) Study Section (2007-2010)

National Institute for Occupational Safety and Health (NIOSH) Education and Research Center review committees (2010 and 2007)

Mine Safety Technology and Training Commission, as chair, which is an independent commission with expenses funded by the National Mining Association and focusing on technology and training solutions to the 2006 Sago Mine and Darby Mine disasters and to address proactively mine safety issues.

Ramsay Gold Medal Award Committee, Society for Mining, Metallurgy and Exploration (2006-2009)

SME Education and Professional Strategic Committee (2006-2008)

Mine Safety and Health Research Advisory Committee, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, Department of Health and Human Services, Washington, DC, 2004-2005 (served as Chair)

Executive Committee, representing Mineral and Energy Resources Section, Board on Natural Resources, National Association of State Universities and Land Grant Colleges, 2001-2004; Chair of Mineral and Energy Resources Section, 2004.

Student Member Affairs Committee, SME, 2004-2006

Frank F. Aplan Award Committee, 2003, AIME, Chair

Robert Earl McConnell Award Committee (2001-02), AIME, 2002 Chair

Board of Directors, SME (1999-2002), representing Coal Division

Program Chair, 2000 SME Annual Meeting, Salt Lake City

Chair, 2000, Coal Division, SME

Coal Division Executive Committee, SME-AIME (1993-2001)

Program Chair, Coal Division, 1998 SME Annual Meeting, Orlando

Program Committee, SME 1998 Annual Meeting, Orlando

Program Coordination Committee, SME (1995-96)

Distinguished Member Award Committee, SME-AIME (1995-97; 1999)

Distinguished Service Award Committee, Coal Division, SME-AIME (1997-2000)

Stefanko Award Committee, SME Coal Division (1997-99)

Frank F. Aplan Award Committee, SME (2000)

Ramsay Medal Award Committee, AIME (1994-97; 2006-present, chair for 1996)

Council of Education, SME-AIME (1995-99; Chair, 1995-97)

Committee on Educational Quality, SME-AIME (1995-97)

Education Planning Committee, SME-AIME (1989-91; chair 1991)

Underground Mining Unit Committee, Coal Division, SME-AIME (1995-98;
publications chair for 1996; chair for 1997)

Scholarship Committee, Coal Division, SME-AIME (1996-99)

Research and Development Unit Committee, Coal Division, SME-AIME (1995-98)

Health & Safety Unit Committee, Coal Division, SME (1993-1996)

Eavenson Award Committee, Coal Division, SME (1993-1996)

Operations Research Unit Committee, Mining & Exploration Division, SME-AIME
(1987-1993; chair 1993)

Member, Mine Safety and Health Administration Academy Visiting Committee
(1995-96)

Board of Directors, Pittsburgh Coal Mining Institute of America, (1989-2000; 2nd Vice

President, 1996)

Coal Research Committee, National Safety Council, Coal Mining
Section (1987-1993)

West Virginia Coal Mining Institute (1991-1995; Secretary-Treasurer)

HONORS/RECOGNITIONS

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| 2010 | Wilson Faculty Mentoring Award, College of Earth & Mineral Sciences |
| 2007 | Old Timers Club Faculty Award |
| 2007 | Coal People Magazine featured professional, May, Vol. 29, No. 10 |
| 2006 | Sustained Excellence in Teaching Award 2006, School of Materials, Energy & Earth Resources, University of Missouri-Rolla |
| 2006 | Selected to chair the Mine Safety Technology and Training Commission, an independent commission established by the National Mining Association |
| 2006 | Sustained Excellence in Laboratory Instruction Award, School of Materials, Energy, and Earth Resources |
| 2005-2006 | Outstanding Teaching Award, Committee for Effective Teaching and Faculty Awards, University of Missouri-Rolla |
| 2004-2005 | Outstanding Teaching Award, Committee for Effective Teaching and Faculty Awards, University of Missouri-Rolla |
| 2004-2005 | Sustained Teaching Excellence Award, School of Materials, Energy & Earth Resources, University of Missouri-Rolla |
| 2003-2004 | Outstanding Teaching Award, Committee for Effective Teaching and Faculty Awards, University of Missouri-Rolla |
| 2004 | Honorary Professorship, Xi'an University of Science and Technology, Xi'an, China |
| 2004 | Sustained Excellence in Lab Instruction Award, School of Mines & Metallurgy, University of Missouri-Rolla |
| 2004 | Selected to serve as Chair of the Mine Safety and Health Research Advisory Board, National Institute for Occupational Safety and Health, |

- Centers for Disease Control and Prevention, Department of Health and Human Services
- 2004 Received Ivan Rahn Education Award, Society for Mining, Metallurgy, and Exploration, March.
 - 2004 Received the Distinguished Service Award, Coal Division, Society for Mining, Metallurgy, and Exploration, March
 - 2002-2003 Outstanding Teaching Award, Committee for Effective Teaching and Faculty Awards, University of Missouri-Rolla
 - 2002 Elected as a Distinguished Member of the Society for Mining, Metallurgy, and Exploration, Inc.
 - 2001 Stephen McCann Award for Excellence in Education, given by the Pittsburgh Coal Mining Institute of America
 - 2001 Highest Degree of Safety award, 2000/2001, given by the International Society of Mine Safety Professionals
 - 2001 Appreciation Award for "Your Efforts to Improve Mine Safety and Health," given by the CDC-NIOSH Mine Safety and Health Research Advisory Committee
 - 1999 Society for Mining, Metallurgy and Exploration Henry Krumb Lecturer (Elected to give lectures to three SME sections across the U.S.)
 - 1998 Awarded Senior Biomedical Research Service status by the Centers for Disease Control and Prevention (CDC) for Outstanding Scientific Contributions in Public Health, February 2, 1998.
 - 1998 NIOSH Alice Hamilton Award, Physical Science, for research article: Harrison, J.C., Brower, P.S., Attfield, M.D., Doak, C.B., Keane, M.J., Grayson, R.L., and Wallace, W.E., 1997, "Surface Composition of Respirable Silica Particles in a Set of U.S. Anthracite and Bituminous Coal Mine Dusts," J. Aerosol Science, Vol. 28, pp. 689-696, refereed journal article.
 - 1998-2012 Listed in *Who's Who in America*
 - 1998-2012 Listed in *Who's Who in the World*
 - 1999-2001 Listed in *Who's Who in the East*
 - 1996-2012 Listed in *Who's Who in Science and Engineering*

- 1996-2008 Listed in *Who's Who in American Education*
- 1995-1998 Listed in *Who's Who in the South and Southwest*
- 1994-2008 Listed in *Who's Who in Finance and Industry*
- 1995-2000 Listed in *Strathmore's Who's Who Registry of Business Leaders*
- 1997 Balanced Man Award for Teaching Excellence, The Missouri Gamma Chapter of Sigma Phi Epsilon
- 1992 Professional Excellence Award, California University of PA
- 1996, 1990 WVU SME Student Chapter Officer's Award to a faculty member who
1989, 1988 has demonstrated superior dedication to the mining profession and
1986 offers a challenging atmosphere for student growth and development
- 1991, 1990 WVU SME Student Chapter Award for Outstanding Faculty
1988 Member, Mining Engineering
- 1978 Old Timer's Award, Department of Mining Engineering, West Virginia University
- 1974 F.E. Atkins Memorial Award, Mathematics Department, California University of Pennsylvania

INTERNATIONAL ACTIVITIES

- * Interacted with Xi'an University of Science & Technology, Central South University, and China University of Mining & Technology as well as several government agencies on mine health and safety and academic exchanges, 2004
- * Interacted with University of Botswana for a 2+2 exchange program leading to a B.S. in Mining Engineering, 2004
- * Invited keynote speaker at the South Africa Mine Health and Safety Biannual Review of progress on new mining regulations, 2001
- * Presented a two-day short course on underground coal mining to CEMEX in Monterey, Mexico, focusing on a new acquisition in Sabina, Mexico; made a Follow-up visit to the mine, giving a technical report on findings with recommendations.
- * Member, International Committee for Coal Research, for NIOSH; meetings held

annually across the world to coordinate coal research among member nations, 1998-2000.

- * Presented lectures at seminars and short courses to ten coal industry delegations visiting West Virginia University from China, Poland, Siberia, and Ukraine: 1993, 1994, 1995, and 1996.
- * Attained funding through Partners in Economic Reform to effect a research and education exchange of one professor and two graduate students from Donetsk State Technical University, Ukraine, for five months in 1994.
- * Presented lectures at two seminars held by coal associations in the Kuzbass coal region of Russia in 1994: topics included an overview of the U.S. coal industry, coal enterprise management and structure, incentive/bonus plans, and criteria for obtaining loans with western banks.
- * Negotiated an agreement with the Department of Science, Technology and Education of the Chinese coal ministry in 1994 to govern the training, technology transfer and research activities between the College and organizations designated by them, including the National Safety Training Center and the Beijing Coal Mining Management Institute.
- * Presented lectures on the following topics at the institutions designated while on a professional exchange trip to China (May 19 - June 1, 1993):
 1. The Mine Management Support System, at Beijing Coal Mining Management Institute and at North China Mining College/National Safety Training Center;
 2. Overview of the U. S. Coal Industry, at Beijing Coal Mining Management Institute;
 3. The Use of Computers and Software in the U. S. Coal Industry, at Beijing Coal Mining Management Institute;
 4. Integrated Production and Cost Management, at Beijing Coal Mine Management Institute;
 5. The Application of Ventilation Network Analysis in the U. S. Coal Industry, at National Safety Training Center/North China Mining College;
 6. The Status and Future of U.S. Mining Schools, at National Safety Training Center/North China Mining College.
- * Invited expert participant in the U.S.-Ukraine Seminar on Coal Regions of the

World, Truskavets, Ukraine, in 1992.

- * Invited expert participant in the Indo-U.S. Symposium and Roundtable on Computers in the Mineral Industry, Dhanbad, India, in 1991.
- * Visited underground coal mines in Australia, China, India, Siberia, and Ukraine.

PUBLICATIONS AND REPORTS

PAPERS/ARTICLES

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117. Grayson, R.L., and Wang, Y.J., 1987, "Optimizing Coal Mine Inventory Costs with Material Requirements Planning," *Trans. SME-AIME*, Vol. 280, pp. 1834-1838, refereed journal article.

118. Grayson, R.L., Althouse, R.C., and Klishis, M.J., 1987, "Preparing the Section Foreman for His Full Responsibilities," *Trans. SME-AIME*, Vol. 280, pp. 2089-2094, refereed journal article.
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120. Grayson, R.L., Althouse, R.C., Klishis, M.J., and Brooks, F.C., 1987, "Increasing Proficiency in Prep Plant Workers," *Coal Prep '87*, Coal Mining, Chicago, pp. 260-274.
121. Grayson, R.L., Klishis, M.J., Althouse, R.C., and Lies, G.M., 1987, "A Management Strategy for Improving Longwall Operational Performances," *Proc. Longwall USA*, Coal Mining, Chicago, pp. 53-75.
122. Grayson, R.L., 1986, "An Integrated Production and Cost Management System for Underground Coal Mines," *Ph.D. Dissertation*, West Virginia University, Department of Mining Engineering, 226 pp.
123. Grayson, R.L., and Peng, S.S., 1986, "Characterization of Respirable Dust on a Longwall Panel -- A Case Study," *Proc. Engineering Health and Safety in Coal Mining*, SME-AIME, Littleton, CO, pp. 95-117.
124. Khair, A.W., Reddy, N.P., and Grayson, R.L., 1986, "The Effect of Immediate Strata on Pillar Behavior in Retreat Pillaring -- A Case Study," *Proc. 5th Conf. on Ground Control in Mining*, West Virginia University, Morgantown, WV, pp. 257-277.
125. Grayson, R.L., and Peng, S.S., 1986, "Optimizing Longwall Panel Dimensions by Minimizing Total Mine Cost," *Longwall USA*, Coal Mining, Chicago, pp. 61-81.
126. Klishis, M.J., Grayson, R.L., Althouse, R.C., and Lies, G.M., 1986, "Longwall Systems: Overview and Assessment of Training," *Longwall USA*, Coal Mining, Chicago, pp. 113-134.
127. Nutter, R.S., Reddy, Y.V., and Grayson, R.L., 1986, "Face Decision Support System Status Report -- 1986," *Proc. 8th WVU Int. Mining Electrotechnology Conf.*, West Virginia University, Morgantown, WV, pp. 63-64.
128. Grayson, R.L., Lies, G.M., Klishis, M.J., and Althouse, R.C., 1986, "Training in Operations for Longwall Mining," *Proc. 5th Annual Meeting of CAME*, National Mine Health and Safety Academy, Beckley, WV, pp. 2-36.
129. Grayson, R.L., and Peng, S.S., 1985, "Super Section Speeds Development," *Coal Mining*, Vol. 90, No. 7, pp. 69-70, widely recognized coal industry journal.

130. Grayson, R.L., and Wang, Y.J., 1985, "Forecasting Underground Coal Mine Productivity with a Microcomputer," *Proc. Second Conf. on the Use of Computers in the Coal Industry*, SME-AIME, New York, pp. 157-164.
131. Grayson, R.L., and Peng, S.S., 1984, "Analysis of an Airborne Dust Study Made for a Southwestern Pennsylvania Underground Bituminous Coal Mine," *Proc. Coal Mine Dust Conf.*, West Virginia University, Morgantown, WV, pp. 13-15.
132. Grayson, R.L., and Peng, S.S., 1984, "Correlation of Respirable Dust Mass Concentration with Worker Positions," *Proc. Coal Mine Dust Conf.*, West Virginia University, Morgantown, WV, pp. 256-261.
133. Grayson, R.L., and Wang, Y.J., 1983, "Selection of Mining Machinery Based on Mechanical Delay Statistics: An Application of Goal Programming to Capital Budgeting," *Trans. SME-AIME*, Vol. 274, pp. 2019-2023, refereed journal article.
134. Grayson, R.L., Mishra, G., and Wang, Y.J., 1982, "Modeling the Ventilation Network for an Old Coal Mine," *Proc. 1st Mine Ventilation Symp.*, H.L. Hartman, ed., SME-AIME, New York, NY, pp. 103-109.
135. Grayson, R.L., and Mishra, G., 1982, "Understanding and Controlling Mine Subsidence Over a Longwall Panel," *Papers of the 1982 American Mining Congress Convention*, AMC, Washington, D. C., international industry proceedings.
136. Grayson, R.L., and Mishra, G., 1981, "An Engineering Analysis of 'Squeeze' Failure of Pillars in the Pittsburgh Coal Bed," *Proc. 1st Conf. on Ground Control In Mining*, West Virginia University, Morgantown, WV, pp. 144-153.

TECHNICAL REPORTS

137. Grayson, R.L., 2007, Engineering Evaluation of Kennedy Rescue Chamber, submitted to West Virginia Office of Miners Health, Safety and Training, Mine Technology and Training Task Force, 53 pp.
138. Grayson, R.L., 1997, "Commercialization of Single Stage Fine Coal Dewatering and Briquetting Process," *Final Technical Report* for September 1, 1996 through August 31, 1997 to the Illinois Clean Coal Institute, ICCI Project No. 96-1/1.1B-2, 21 pp.
139. Grayson, R.L., 1997, "Structured Analysis of 1996 West Virginia Underground Coal Mine Accidents," *Technical Report* to West Virginia Board for Coal Mine Health and Safety and the West Virginia Technical Review Committee, 112 pp.
140. Grayson, R.L., 1996, "Detailed Analysis of Underground Back Injuries -- 1993 Data," *Technical Report* to the West Virginia Mine Safety and Technical Review Committee, 20 pp.

141. Grayson, R.L., 1996, "New Accident-Analysis Perspectives for Development of Job Intervention Priorities and Strategies," **Technical Report** to the West Virginia Mine Safety and Technical Review Committee, 121 pp.
142. Estes, C.D., Zahradnik, R.L., Aminian, K., Grayson, R.L., Patchen, D., Siriwardane, H., and Bajura, R., 1995, "On-Site Power Generation at the Emerald Mine Using Coal Mine Methane," **Phase I Topical Report** on DOE Contract No. DE-AC21, 95MC32185, 118 pp.
143. Winn, G.S., Elliott, G.D., and Grayson, R.L., 1994, "Investigation of Countermeasures to Solve West Virginia's Small Mines Fatality Problem," **FY93 Final Report** on NRCCE Project Number MN-3-93 (1) M, 13 pp.
144. Grayson, R.L., 1994, "Analysis of Safety Issues and the Compliance of Partial Cuts Extracted by a Continuous Mining Machine in the 11D Longwall Development Panel in the Dilworth Mine as Shelter Holes in Accordance with Section 268(b) of the Bituminous Coal Mining Laws of Pennsylvania for Underground Mines," **Technical Report** submitted to Dickie, McCamey, & Chilcote, 50 pp.
145. Grayson, R.L., 1994, "The Spacing of Shelter Holes Along the Track Haulage in Longwall Panels of the Dilworth Mine," **Technical Report** submitted to Jackson & Kelly, 36 pp.
146. Ziemkiewicz, P., Martinelli, D., Banta, L., Peng, S., Grayson, R., Nutter, R., Gabr, M., and Bowders, J., 1994, "Remote Mining For In Situ Waste Containment," **Final Technical Report - Phase I**, submitted to DOE on Contract Number DE-AC21-92MC29121, two volumes.
147. Nutter, R.S., Grayson, R.L., Banta, L.E., et al., 1993, "Development of Flexible Automation of Underground Coal Mines: Mine Management Support System; Neural Network Navigation," **Mining Research Contract Report** for USBM Contract No. H0388030, 265 pp.
148. Klishis, M.J., Althouse, R.C., Stobbe, T.J., Plummer, R.W., Grayson, R.L., Layne, L.A., and Lies, G.M., 1993, "Coal Mine Injury Analysis: A Model for Reduction Through Training; Volume VIII - Accident Risk During the Roof Bolting Cycle: Analysis of Problems and Potential Solutions," **Final Report** for USBM Cooperative Agreements C0167023.
149. Grayson, R. L., 1992, "Research on Potential Mechanisms for the Creation of White Centers in Respirable Dust Sampling Filters," **Report of Findings** submitted to Crowell & Moring, Washington, D. C., 67 pp.

150. Grayson, R.L., 1990 "Correlation of Respirable Dust Characteristics to Coal Seams," ***Final Report*** on Project WVO6, submitted to the Generic Mineral Technology Center for Respirable Dust, 6 pp.
151. Mutmanský, J.M., Grayson, R.L., Rubow, K.L., Marple, V.A., Stobbe, T.L., Myers, W.R., Ramani, R. V., Frantz, R.L., 1989, "Formulation, Evaluation and Verification of Improved Dust Sampling and Analytical Strategies for Use at Surface and Underground Coal Mines," ***Summary Status Report*** on USBM Project Numbers 4222/5422/2722, NTIS, Springfield, VA, 140 pp.
152. Klishis, M.J., Althouse, R. C., Grayson, R.L., and Lies, G.M., 1989, "A Performance Based Approach to Improve Skills, Safety, and Training in the Mining Industry," ***Final Report*** submitted to the U.S. Bureau of Mines for Contract J0145026, 219 pp.
153. Grayson, R.L., Wang, Y.J., Reddy, N.P., Georgiana, M., Zhao, L., and Dean, J., 1989, "Computer Usage and Software Applications in the Coal Industry," ***Final Report*** submitted to the EWRC for Project Number MN-1-88, 59 pp.
154. Georgiana, M., Grayson, R.L., and Peng, S., 1988, "An Economic Analysis of Longwall Innovations," ***Final Report*** submitted to the Longwall Mining and Ground Control Research Center, West Virginia University, 39 pp.
155. Nutter, R.S., Jr., Reddy, Y.V., Raman, R.S., Londono, F., Chattree, N., Watts, C.M., Grayson, R.L., and Klishis, M.L., 1988, "Face Decision Support System," ***Final Report*** submitted to the U.S. Bureau of Mines for Contract H0358020, 162 pp.
156. Lies, G.M., Althouse, R.C., Grayson, R.L., and Klishis, M.J., 1988, "Underground Haulage Subsystems: An Assessment of Training Needs," ***Summary Report***, USBM Contract J01450246, Research to Formalize Health, Safety, and Occupational Training, May, 58 pp.
157. Grayson, R.L., and Peng, S.S., 1986, "Correlation of Respirable Dust Characteristics to Worker Locations on a Longwall Panel," ***Interim Report*** (10/1/83-2/28/86) submitted to the Generic Mineral Technology Center for Respirable Dust, 67 pp.
158. Lies, G.M., Althouse, R.C., Grayson, R.L., Klishis, M.J., and Peton, J.S., Jr., 1986, "Assessment of Training in Longwall Mining," ***Summary Report***, USBM Contract J01450246, Research to Formalize Health, Safety and Occupational Training, 111 pp.
159. Brooks, F.C., Collins, T., Althouse, R.C., Grayson, R.L., and Klishis, M.J., 1986, "Coal Preparation: Overview and Assessment of Training," ***Summary Report***, USBM Contract J01450246, Research to Formalize Health, Safety and Occupational Training, 89 pp.
160. Klishis, M.J., Althouse, R.C., Grayson, R.L., Mariner, T., Plummer, R.W., and Stobbe, T.J., 1986, "An Assessment of the Health and Safety Aspects of Roof

Bolting," *Summary Report* submitted to the U.S. Bureau of Mines under Cooperative Agreement No. C0167023, 140 pp.

WRITTEN COMMENTS ON REGULATORY ISSUES (non-NIOSH role)

161. 1995, Peer-review comments regarding the effectiveness of the course entitled "Bleeder and Gob Ventilation Systems," 6 pp.
162. 1995, Comments to MSHA regarding Proposed Rule on Decertification of Approved Instructors and Certified and Qualified Persons: 30 CFR Parts 42, 48, 70, 71, 75, 77, and 90.
163. 1994, Comments to MSHA regarding small-mine problems and issues, presented at the Small-Mine Summit, April 9.
164. 1990, Comments to MSHA regarding Part 75 - Ventilation Belt Entry, presented at public hearing at Reston, VA.

BOOK

165. Grayson, R.L., et al., 2003, *Materials Count: The Case for Material Flows Analysis*, National Research Council, The National Academies Press, Washington, DC, 146 pp.

BOOK CHAPTERS

166. Grayson, R.L., 2010, "Environmentally Conscious Coal Mining," *Environmentally Conscious Fossil Energy Production*, eds. Myer Kutz and Ali Elkamel, John Wiley & Sons, Inc., New York, pp. 127-142.
167. Grayson, R.L., 2009, Chapter 6: "Human Resources Management," Section within chapter titled "Safety Management: Building a Culture of Prevention," *Sustainable Management of Mining Operations*, Senior Editor: J. Botin, Chapter Editors: L. Freeman and H. Miller, Society for Mining, Metallurgy, and Exploration, ISBN 978-0-87335-267-3, pp. 137-144.
168. Grayson, R.L., and Watzman, B., 2001, "History and Overview of Mine Health and Safety," Chapter 1, *Concepts and Processes in Mine Health and Safety Management*, M. Karmis, ed., SME, Littleton, CO, pp. 1-13.

169. Grayson, R.L., 2001, "Hazard Identification, Risk Management, and Hazard Control," Chapter 17, *Concepts and Processes in Mine Health and Safety Management*, M. Karmis, ed., SME, Littleton, CO, pp. 247-261.
170. Grayson, R.L., 1999, "Mine Health and Safety: Industry's March Towards Continuous Improvement – The United States Experience," Chapter 7, *Environmental Science*, J. Azcue, ed., Springer-Verlag, Heidelberg, pp. 83-100.
171. Reuther, R., R. Bajura, R. L. Grayson, and P.C. Crouse, 1998, "Fossil Fuels," Section 7.3, *The CRC Handbook of Mechanical Engineering*, F. Kreith, ed., CRC Press, 2624 pp.

PROCEEDINGS CO-EDITED

172. 1996, *Proceedings, 5th Conference on the Use of Computers in the Coal Industry*, S.D. Thompson, R.L. Grayson, and Y.J. Wang, eds., West Virginia University.
173. 1990, *Proceedings, 4th Conference on the Use of Computers in the Coal Industry*, R.L. Grayson, Y.J. Wang, and R.L. Sanford, eds., A.A. Balkema Publishers, Rotterdam, Netherlands.
174. 1986, *Proceedings, 3rd Conference on the Use of Computers in the Coal Industry*, Y.J. Wang, R.L. Grayson, and R.L. Sanford, eds., A.A. Balkema Publishers, Rotterdam, Netherlands.

POETRY

175. 1994, "Upending Winter's Urn," *Echoes of Yesterday*, The National Library of Poetry, p. 31.
176. 1995, "The Mockingbird," *Best Poems of 1995*, The National Library of Poetry, p. 95.
177. 1996, "An Eternal Love," *Best Poems of the '90s*, The National Library of Poetry, p. 269.
178. 1996, "The Fall of Hector," *The Rainbow's End*, The National Library of Poetry, p. 200.
179. 1996, "Goodbye. I know you. There's No Tomorrow." *Shadows and Light*, The National Library of Poetry, p. 157.
180. 1996, "To Them Who Taught So Well," *Best Poems of 1996*, The National Library of Poetry, p. 81.

- 181. 1997, "Caprice," *Best Poems of 1997*, The National Library of Poetry, p. 250.
- 182. 2001, "The City with a River Running Through It," *What Tomorrow Holds*, The International Library of Poetry, p. 209.
- 183. In press, "My Mackie," *Labours of Love*, Noble House London.
- 184. In press, "Just Thanking God for His Creation," *The Best Poems and Poets of 2004*, The International Library of Poetry.

NON-PUBLISHED TECHNICAL PRESENTATIONS WITHOUT PAPER

- 185. Presentation of the coal industry at the Army War College at a Strategic Leadership session, Carlisle, PA, March 21, 2011
- 186. Presentation on Escape Procedures at the Escape & Survive: A Miners' Town Hall Meeting, Greensburg, PA, June 18, 2008
- 187. Keynote presentation at the 12th Professional Development Seminar for Mine Safety Supervisors, Allentown, PA, 2007
- 188. Keynote presentation at Mining Industry Partnership Aggregate Meeting on Partnerships in Mining Founded on Addressing Issues/Needs, 2007
- 189. Presentation at PCMIA Student Luncheon on What Can I Do to Change Mining's Perception in Society?, 2007
- 190. Presentation on Mine Safety and Technology Commission findings and recommendations at venues in AL (1), KY (1), PA (1), WV (2), SME (1), and Washington, DC (1), 2006.
- 191. Presentation on *State of Mining Engineering Programs and Recruitment in the U.S.; Training New Miners*, Atlantic Alliance Symposium on Mining Safety, Orlando, FL, September 23, 2005.
- 192. Presentation on *Material Flows Accounting in the United States: A Status Report*, NSF-funded Workshop on Data Scope and Data Structures for National Material Accounts, Yale University, New Haven, CN, September 20, 2005.
- 193. Keynote address on *Mining Research Organizational Models: Government and Academic Similarities and Differences*, Symposium on Applications of Computers and Operations Research in Mining, University of Arizona, Tucson, Arizona, March 31, 2005.

194. Presentation to the Power Supply Community Task Force on *Coal as a Choice for Incremental Power Generation in Springfield and Greene County: Information and Issues*, Springfield, MO, March 28, 2005.
195. Presentation on *Mining as a Case Study*, National Academies Planning Meeting for Scientific and Technical Input for the Revision of the World Bank Group's Pollution Prevention and Abatement Handbook, National Academy of Sciences, Washington, D.C., November 12, 2004.
196. 2004, presentation to Interagency Workgroup on Material Flows Accounting on NRC report entitled *Materials Count: The Case for Material Flows Analysis*, White House Conference Center, Washington, D.C.
197. Presentation on Material Flows Accounting of Natural Resources, Products, and Residuals, RCRA conference, Washington, D.C., July 2003.
198. Keynote address at the Western Mining Training Summit, Colorado School of Mines, Golden, Colorado, July 24, 2002.
199. 2001, Keynote Address at the Joint Western Training Needs Assessment Seminar, Golden, Colorado, July 25.
200. 2001, Keynote Address at the 2nd South African Mine Health and Safety Summit, Pretoria, April 20.
201. 2000, "The Use of Diesels in Underground Mining: A U.S. Perspective," MINExpo International 2000, Las Vegas, NV, October 10.
202. 2000, Banquet Speaker, National Stone Association Safety Awards, Dearborn, MI, July 16.
203. 2000, "Update on NIOSH," Mining Critical Issues Conference, Rock Falls, ID, June 27.
204. 2000, "Mine Health and Safety: Progress and Prospects for the Future," Georgia Mining Association and Georgia Crushed Stone Association Joint Safety and Health Workshop, Macon, GA, May 25 and 26.
205. 2000, Opening Remarks, Rock Mechanics Short Course, NIOSH Spokane Research Laboratory, Elko, NV, May 23.
206. 2000, "Research Funding Opportunities in Washington-NIOSH," SME Research Council, Salt Lake City, UT, February 29.
207. 2000, "NIOSH Policy and Projects on Diesel Particulate Matter," Underground Mine Ventilation Session, SME Annual Meeting, Salt Lake City, February 29.

208. 2000, "A Century of Progress in Mining ... Prospects for the Future," SME Henry Krumb Lecture presented to the southeastern U.S. Section, February 12, invited presentation.
209. 1999, "A Century of Progress in Mining ... Prospects for the Future," SME Henry Krumb Lecture presented to the Chicago Section, November 11, invited presentation.
210. 1999, "Prioritized Mine Health and Safety Issues in NIOSH," 102nd National Western Mining Conference, Colorado Springs, CO, November 4.
211. 1999, "Mine Health and Safety Research in the National Institute for Occupational Safety and Health," International Committee for Coal Research, Wellington, New Zealand, October 18.
212. 1999, "NIOSH Mine Health and Safety Program and Priorities," National Mining Association Health and Safety Committee meeting, St. Louis, MO, October 11.
213. 1999, "Performance Measures in Occupational Safety and Health, Conference on The Future Culture of Mining Safety and Health in North America," Winnipeg, Manitoba, Canada, September 24, invited presentation.
214. 1999, "Ergonomics, Human Factors, and Musculoskeletal Injuries," Conference on The Future Culture of Mining Safety and Health in North America, Winnipeg, Manitoba, Canada, September 23, invited presentation.
215. 1999, "A Century of Progress in Mining ... Prospects for the Future," SME Henry Krumb Lecture presented to the southwestern Wyoming Section, September 15, invited presentation.
216. 1999, "Health and Safety Performances for Coal and Metal/Nonmetal Mining and Prospects for Future Progress," SME-Washington, D.C. Section luncheon, September 14, invited presentation.
217. 1999, Opening and closing remarks for NIOSH at the NIOSH/MSHA Joint Conference on Self-Contained Self Rescuers, MSHA Academy, Beckley, WV, June 15-17.
218. 1999, Keynote address entitled "The State of Mining Research in NIOSH," 8th U.S. Mine Ventilation Symposium, Rolla, MO, June 14.
219. 1999, "NIOSH Mining Research," Fuelcell Propulsion Institute Annual Board Meeting, Sudbury, Ontario, Canada, in support of diesel partnerships, April 28, invited presentation.
220. 1999, "NIOSH Underground Coal Mining Programs," Coal Ops 99, Knoxville, TN, April 9.

221. 1999, "NIOSH Surface Coal Mining Programs," Coal Ops 99, Knoxville, TN, April 8.
222. 1999, Keynote address entitled "Mine Health and Safety: Progress and Prospects for the Future" at the Coal Division technical session on mine safety and health at the Society for Mining, Metallurgy, and Exploration Annual Meeting, Denver, CO, March 2.
223. 1998, "Mine Health and Safety Management: Approaches, Issues, and Tools," at the Underground Stone Seminar, Cincinnati, OH, December 9.
224. 1998, "NIOSH Mining Research," National Advisory Committee for Occupational Safety and Health, Washington, D.C., November 10.
225. 1998, "Vision for Mining and Mine Health and Safety in 2005," luncheon address at the Joint Meeting of the Pittsburgh Coal Mining Institute of America/SME Pittsburgh Section, October 29-30, Meadowlands, PA, invited address.
226. 1998, "The Evolving NIOSH Mining Research Program and Silica-Related Activities," luncheon address presented at the National Industrial Sand Association Semiannual Meeting, October 21, Washington, D.C., invited address.
227. 1998, "Mine Health and Safety Research at NIOSH," keynote address presented at the Western Workshop on Mining Health and Safety, August 13, Salt Lake City, UT, invited presentation.
228. 1998, "Mine Health and Safety Research at NIOSH," keynote address presented at the National Joint Meeting of the Holmes Safety Association, National Association of State Mine Inspectors of America, and Mine Inspectors Institute of America, June 23, Tampa, FL, invited address.
229. 1998, "Mining: Digging Deeper to Control Exposure and Eliminate Disease and Injury," presented at Public Health Professional Conference, June 7-11, Alexandria, VA, invited presentation.
230. 1998, "Commonalities between Construction and Mining Health and Safety Issues and Problems," presented at Center to Protect Workers' Rights, March 26, Washington, D.C., invited presentation.
231. 1998, "Mine Safety and Health Research," presented at the 5th Annual Mine Health and Safety Conference, March 11-12, Washington, D.C.: invited presentation.
232. 1998, "The Outlook from Washington: Mine Health and Safety Research," presented at the SME Annual Meeting, Research Council, March 3, invited presentation.

- 233. 1997, "Commercialization of a Single State Fine Coal Dewatering and Briquetting Process, presented at the 15th Annual Contractors' Technical Conference, Illinois Clean Coal Institute, Champaign, IL, July 29.
- 234. 1997, "Evolving Cultural Change in Safety and Operations," presented at the Southeast Missouri Mine Safety Awards Banquet in Farmington, MO, March 13.
- 235. 1997, "Where Do We Go From Here? Does Technology Have Any Giant Leaps Left?" Panel Discussion at SME Annual Meeting in Denver, CO, in the Underground Coal Mining II Session.
- 236. 1996, "Risk Analysis for Mining Operations," Panel Discussion at the PCMIA-PCA Special Seminar on Mine Safety and Health Law, Greensburg, PA.
- 237. 1996, "The Mining Industry's Response to Economic Competition," presented at the WVU Student Chapter of ASCE and Northern WV Branch of ASCE Spring Technical Conference, West Virginia University.
- 238. 1995, "Addressing the Small-Mine Safety Issue in West Virginia," 2nd Int. Conf. on the Health of Miners, Pittsburgh, PA.
- 239. 1995, "Systematic On-Site Monitoring of Compliance Dust Samples," 2nd Int. Conf. on the Health of Miners, Pittsburgh, PA.
- 240. 1995, "Engineering Education Issues" presented at seminar on Establishing Professional Engineering Firms in West Virginia, Charleston, WV.
- 241. 1995, "West Virginia and the Environment" presented at Earth Day conference, West Virginia University.
- 242. 1995, "Mergers, the Coal Industry, and COMER," presented at the Southern West Virginia Coal Prep and Engineering Society monthly meeting, Beckley, West Virginia.
- 243. 1994, "Attacking the Small-Mine Fatality Problem in West Virginia," presented at the Careers in Coal Annual Meeting, St. Simons Island, Georgia.
- 244. 1993, "Optimization of Manpower Utilization on a Work Shift," presented at the WVCMI/SME-CAS Fall Meeting, White Sulphur Springs, WV.
- 245. 1990, "Development of a Management Tool to Assist Operational Reporting and Control," presented at the Joint Spring Meeting of WVCMI and SME-CAS, Charleston, WV.
- 246. 1989, "Computerized Mine Management and Monitoring," presented at the WVCMI/SME-CAS Fall Meeting, White Sulphur Springs, WV.

GRANTS AND CONTRACTS

AS PI or CO-PI

1. Breakthrough Energy Savings with Waterjet Technology, Department of Energy, \$94,165, Department of Energy, began June 1, 2005 (1 year), co-PI.
2. Western U.S. Mining Safety and Health Training & Translation Center, grant award from Centers for Disease Control and Prevention's National Institute for Occupational Safety and Health, \$4.02 million, began September 1, 2004 (five years), director and PI.
3. Graduate Assistance in Areas of National Need (GAANN): Granted three fellowships dedicated to developing faculty to pursue research on Energy Technology Linked with Public Policy Making, U.S. Department of Education, \$367,000; began August 15, 2004 (three years), PI.
4. Graduate Assistance in Areas of National Need (GAANN): Granted five fellowships dedicated to developing faculty to pursue Environmentally-Sustainable Mineral Industries research, U.S. Department of Education, \$367,000; began September 1, 1997 (three years), co-PI.
5. On-Site Power Generation at the Emerald Mine Using Coal Mine Methane, DOE-METC, \$464,927; began May 21, 1995 (proposed 1.5-year project).
6. Third-Year Funding for Small-Mine Assistance Center, WVOMHST-Technical Review committee, \$40,000; began July 1, 1996.
7. Phase I Implementation of the Small-Mine Assistance Center, WVOMHST-Technical Review Committee, \$33,000; began July 1, 1995.
8. A Fuzzy Logic-Based Expert Consultation System for Coalbed Methane Control and Degasification Based on the WVU MMSS System and Integrating the USBM METHPRO System, NRCCE-COMER, \$46,000; began January 1, 1995 (two-year project).
9. Planning the Structure and Mission of a Statewide Center for Mine Health and Safety: Addressing the Small-Mine Needs, West Virginia Office of Miners' Health, Safety and Training Technical Review Committee, \$42,000, began September 1994 (proposed two-year project).
10. Investigation of Countermeasures to Solve West Virginia's Small-Mine Fatality Problem, NRCCE, \$24,000, completed June 30, 1993 (one-year project).

11. Remote Mining For In Situ Waste Containment, U.S. DOE, \$450,000; Phase I completed May, 1994 (18-month project).
12. Investigations of the Relationships Between Respirable Dust Concentrations and Coal Seam Characteristics, USBM, Generic Mineral Technology Center for Respirable Dust, \$228,000; completed September 30, 1994 (three-year project).
13. Mineralogical Identification, Sizing, and Depth Profiling of Respirable Coal Mine Dust Particles, USBM, Generic Mineral Technology Center for Respirable Dust, \$252,000; completed September 30, 1993 (three-year project).
14. Flexible Automation in Underground Coal Mines, USBM and EWRC, \$2,253,000; completed September 30, 1993 (five-year project).
15. Correlation of Respirable Dust Characteristics with Coal Seams, Worker Positions and Mining Methods, USBM, Generic Mineral Technology Center for Respirable Dust, \$297,000; completed September 30, 1990 (three-year project).
16. Computer Usage and Software Applications in the Coal Industry, EWRC, \$20,000 first year, \$16,000 second year, completed in June, 1989.
17. Formulation, Evaluation, and Verification of Improved Dust Sampling and Analytical Strategies for Use at Coal Mines, USBM, Generic Mineral Technology Center for Respirable Dust, \$106,790, completed in March 1990 (two-year project).

AS RESEARCH ASSOCIATE

18. Coal Mine Injury Analysis: A Model for Reduction Through Training, USBM, \$220,000; completed December 1992 (three-year project).
19. Research to Formalize Health, Safety, and Occupational Training, USBM, \$437,102; completed August 1989 (four-year project).
20. Face Decision Support System for Underground Coal Mine Section Foremen, USBM-EWRC, \$707,210, completed August 1988 (five-year project).

ACADEMIC SUPERVISION (1987-2007)

As chairman: ten M.S. theses and five Ph.D. dissertations completed

On committee: twenty-two Ph.D. dissertations and twenty-five M.S. theses completed

Supervising one Ph.D. and one M.S. student presently

OTHER SERVICE

- Member, EMS Post-Tenure 5-Year Review Committee
- Chair, EME Faculty Activity Evaluation Committee
- Chair, Management Task Force, University of Missouri-Rolla, 2005
- Member, Budgetary Affairs Committee, University of Missouri-Rolla, 2004-2005
- Member, Student Conduct Committee, University of Missouri-Rolla, 2004-2005
- Chair, Quenon Endowed Chair of Mining Engineering Search Committee, 2002-03
- Member, Committee of Department Chairs, University of Missouri-Rolla, 2000-present
- Member, Provost's Advisory Committee, Vice Provost for UMR Global
- Member, Student Scholastic Appeals Committee, 2002-03
- Chair, Search Committee for Library Director, 2002
- Member, Library and Learning Resources Committee, 2002-03
- Member, Quality Assurance Committee for National Occupational Research Agenda, NIOSH, 1999-2000.
- Member, NIOSH Secondary Review Committee (programmatic reviewer of research grant applications), 1999-2000.
- Co-organizer and major sponsor of NIOSH Workshop on Construction, Agriculture, and Mining Partnerships, 2000.
- Moderator for Keynote Session entitled "Meeting 21st Century Challenges to Mining" at SME 2000 Annual Meeting, Salt Lake City, February 28.
- Extensive service to the Society for Mining, Metallurgy, and Exploration, Inc., as outlined earlier.
- Presented *Mine Health and Safety Management: Approaches, Issues, and Tools* workshop at the NIOSH Underground Stone Seminar, Cincinnati, OH, December 9, 1998.

- Co-presenter at University of Missouri-Rolla ***Longwall Mining*** short course for BHP Minerals, San Juan Basin, New Mexico, February, 1998.
- Chair, Underground Mining Session, Coal Division, 1998 SME Annual Meeting, Orlando, FL, March 9-11.
- Session Chair, 1997 Northwest Mining Association Annual Meeting, December 15, 1997, Spokane, WA: NIOSH Panel Discussion – Practical Safety and Health Concerns.
- Member, Chancellor's Grievance Hearing Panel, UMR, 1996-1998.
- Member, Quenon Professorship Search Committee, UMR Department of Mining Engineering, 1996.
- Graduate Council Representative, UMR Department of Mining Engineering, 1997.
- Co-Instructor, MSHA-approved new annual refresher training format at Mingo Logan Coal Company, Wharncliffe, WV, July, 1996.
- Co-Director and Instructor, Project Evaluation Methods short course, given to professional engineers at Mingo-Logan Coal Company, Wharncliffe, WV, July, 1995.
- Peer-reviewed 45 technical articles for USBM, SME, IEEE-IAS, NIOSH, ***Applied Occupational and Environmental Hygiene***, and ***Mineral Resources Engineering***.
- Instructor, Professional Engineers Exam Review short course, West Virginia University, October, 1995, 1994, 1993, 1991, 1990, 1989, 1988, 1987.
- Made 18 public-related presentations at professional organizations, hearings, community events, educational institutions, and a television currents events program.
- Chaired, Search Committee for Dean, College of Agriculture and Forestry, West Virginia University, 1993-94.
- Member, University-wide Health and Safety Committee, 1994.
- Coordinated the first WVU-hosted Pittsburgh Coalbed Methane Forum, 1993.
- Chaired seven other technical sessions at various conferences.
- Conducted a two-day hearing by the West Virginia Mine Inspectors Examining Board on the petition for dismissal of an inspector submitted by the Office of Miners Health, Safety and Training, 1992-93; submitted decision in form of an order.

- Member, TQM Design/Coordinating Team and TQM Steering Committee, West Virginia University, 1992-94.
- Member, Service and Academic Rewards Task Force, West Virginia University, 1992-93.
- Member, Search Committee for Associate Vice President, Finance, West Virginia University, 1992.
- Participated in the US Bureau of Mines and Oak Ridge Institute for Science and Education workshop entitled "Health, Safety and Environmental Regulatory Issues in Mining and Mineral Industries: An Assessment of the Adequacy of College Curricula," in Washington, D. C., on May 12, 1992.
- Member, Benedum Economic Development Proposal Committee, West Virginia University, 1992.
- Member, Search Committee for Dean, College of Engineering, West Virginia University, 1991-92.
- Member, Search Committee for Director, National Research Center for Coal and Energy, West Virginia University, 1991-92.
- Chaired the West Virginia University Task Force on Establishing an Undergraduate Program in Environmental Science/Engineering, West Virginia University, 1991-92.
- Presented technical overview of respirable dust compliance sampling procedures on WNPB public television program entitled "Stateline Friday," April 12, 1991.
- Member, Search Committee for Dean, College of Mineral and Energy Resources, West Virginia University, 1990-91.
- Member, Search Committee for an Assistant Professor of Petroleum and Natural Gas Engineering, West Virginia University, 1989-90.
- Senate Bookstore Advisory Board, West Virginia University, 1989-90.
- Director and Instructor, Production and Cost Management Techniques for Coal Mine Managers short course given West Virginia University: 1989, 1988, 1986.
- Instructor, Surface Subsidence Engineering and WVU's Subsidence Model, August 1988.
- Instructor, 36th Coal Preparation Short Course, West Virginia University, August, 1987.

- Demonstrator at Mining Engineering Computer Software Workshop, WVCMI and CAS-SME Joint Fall Meeting, October 22-24, 1987.
- Instructor, Longwall Mining Short Course, West Virginia University, August, 1985.

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As Expert Witness:

- Expert witness for King, Bryan, & Wiley, Jasper, AL, on a mine explosion, 2003.
- Expert witness for Consol, Inc., through Dickie, McCamey & Chilcotte, on alleged personal injury to longwall worker, 1996-1997.
- Expert witness for Monterey Coal Company, through Crowell & Moring, on alleged training citations following a fatality, 1995.
- Expert witness for Consol, Inc., through Jackson & Kelly and Dickie, McCamey, & Chilcotte, on the spacing of shelter holes in the Dilworth Mine, 1994-95.
- Expert witness for Consol, Inc., on permitting of coal development project, 1993.
- Expert witness for numerous coal companies, through Crowell & Moring, Washington, D.C., on alleged AWC dust tampering by coal mine operators, 1991-93.
- Expert witness for Thompson, Hine and Flory, Columbus, Ohio, on Belmont Electric Cooperative, Inc. v. Ohio Power Company, 1988.

Technical Applications for Industry:

- Kennedy Metal Products, Illinois, on certification of refuge chamber in West Virginia, 2007.
- Fred Weber, Inc., St. Louis, on mine permitting issues for zoning board hearing, 2006.
- Caterpillar, Big Iron University, Chicago, IL, on worldwide business investments in mining and feasibility studies for mining properties, 2003
- Martin Marietta Minerals, Des Moines, IA, on compliance options for new diesel particulate matter regulations in underground mines, 2003
- Vulcan Materials, Inc., Midwest Division, Chicago, IL, on mine ventilation design, 2002
- Moberly Stone Company, Moberly, MO, on roof control problems, 1997.

- West Virginia Board for Coal Mine Health & Safety and West Virginia Technical Review Committee, 1996 and 1997.
- Shannopin Mining Company, Bobtown, PA, on ventilation problems, 1990.
- Mingo and Logan Coal Company, Wharncliffe, WV, on shift scheduling of workers, 1990.
- U.S. Steel Mining Company, Pittsburgh, PA, on long-term ventilation planning for a two-mine complex, 1989.
- U.S. Steel Mining Company, Pittsburgh, PA, on reasons for productivity differences between their mines and Consol's Bailey mine, 1989.
- Ernst & Young, Cincinnati, OH, on development of an integrated mine management system for Island Creek Corporation, 1989.
- L. A. Gates Company, Beckley, WV, on the percentage recovery for different methods of underground mining, 1989.
- U.S. Steel Mining Company, Washington, PA, on back injuries, 1988.
- Terry Eagle Coal Company, on ventilation planning, 1987.
- Amerikohl Mining, Inc., on mining feasibility, 1987.
- Vesta Mining Co., on ventilation planning, 1987.

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